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09/722,583	11/28/2000	Jun Sik Lee	0465-0758P	5244

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[REDACTED] EXAMINER

KEBEDE, BROOK

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2823

DATE MAILED: 04/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/722,583	LEE, JUN SIK
	<b>Examiner</b>	<b>Art Unit</b>
	Brook Kebede	2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 05 February 2003.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1,2,4,5 and 7-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1,2,4,5 and 7-12 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) All b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a)  The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____	6) <input type="checkbox"/> Other: _____

## DETAILED ACTION

### *Response to Amendment*

1. The amendment to the claims filed on February 5, 2003 does not comply with the requirements of 37 CFR 1.121(c) because the amendment does not properly indicate how many times the amendment has been amended. (See 1(i) and 1(ii) herein below). Amendments to the claims filed after March 1, 2001 must comply with 37 CFR 1.121(c) which states:

(c) Claims.

(1) Amendment by rewriting, directions to cancel or add: Amendments to a claim must be made by rewriting such claim with all changes (e.g., additions, deletions, modifications) included. The rewriting of a claim (with the same number) will be construed as directing the cancellation of the previous version of that claim. A claim may also be canceled by an instruction.

(i) A rewritten or newly added claim must be in clean form, that is, without markings to indicate the changes that have been made. A parenthetical expression should follow the claim number indicating the status of the claim as amended or newly added (e.g., "amended," "twice amended," or "new").

(ii) If a claim is amended by rewriting such claim with the same number, the amendment must be accompanied by another version of the rewritten claim, on one or more pages separate from the amendment, marked up to show all the changes relative to the previous version of that claim. A parenthetical expression should follow the claim number indicating the status of the claim, e.g., "amended," "twice amended," etc. The parenthetical expression "amended," "twice amended," etc. should be the same for both the clean version of the claim under paragraph (c)(1)(i) of this section and the marked up version under this paragraph. The changes may be shown by brackets (for deleted matter) or underlining (for added matter), or by any equivalent marking system. A marked up version does not have to be supplied for an added claim or a canceled claim as it is sufficient to state that a particular claim has been added, or canceled.

(2) A claim canceled by amendment (deleted in its entirety) may be reinstated only by a subsequent amendment presenting the claim as a new claim with a new claim number.

Since the reply filed on February 5, 2003 appears to be *bona fide*, applicant is given a TIME PERIOD of **ONE (1) MONTH or THIRTY (30) DAYS** from the mailing date of this notice, whichever is longer, within which to submit an amendment in compliance with 37 CFR 1.121 in order to avoid abandonment. EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136(a).

2. The amendment filed on February 5, 2003 in Paper No. 15 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no

amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

Claim 1 recites the limitation “**depositing a nitride film and an oxide film over a substrate**, the oxide film being deposited on the nitride film by chemical vapor deposition; sequentially etching the oxide film and the nitride film using a patterned photoresist as a mask” in lines 3-6. However, there is no support for “depositing a nitride film and an oxide film over a substrate” in the specification as well as in the drawings as originally filled. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim 4 recites the limitation “**depositing a nitride film and an oxide film over a semiconductor substrate**, the oxide film being deposited on the nitride film by chemical vapor deposition; sequentially etching the oxide film and the nitride film using a patterned photoresist as a mask” in lines 3-6. However, there is no support for “depositing a nitride film and an oxide film over a substrate” in the specification as well as in the drawings as originally filled.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim 11 recites the limitation “**depositing a nitride film and an oxide film over a semiconductor substrate**, the oxide film being deposited on the nitride film by chemical vapor deposition; sequentially etching the oxide film and the nitride film using a patterned photoresist as a mask” in lines 3-6. However, there is no support for “depositing a nitride film and an oxide film over a substrate” in the specification as well as in the drawings as originally filled.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim 12 recites the limitation “**depositing a nitride film and an oxide film over a semiconductor substrate**, the oxide film being deposited on the nitride film by chemical vapor

deposition; sequentially etching the oxide film and the nitride film using a patterned photoresist as a mask" in lines 3-7. However, there is no support for "depositing a nitride film and an oxide film over a substrate" in the specification as well as in the drawings as originally filed.

Applicant is required to cancel the new matter in the reply to this Office Action.

*Drawings*

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims.

Claim 1 recites the limitation "depositing a conductive layer on a substrate" in line 2. The conductive layer (i.e. 106 or 106a) was not deposited on the substrate. As Figs. 2C-2E, show, the conductive layer formed on the barrier film (105) where in the region of the insulating film (101) and the plug (102). Therefore, "forming a conductive layer on a substrate" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

*Claim Rejections - 35 USC § 112*

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
5. Claims 1, 2, 4, 5 and 7-12 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites the limitation “**depositing a nitride film and an oxide film over a substrate**, the oxide film being deposited on the nitride film by chemical vapor deposition; sequentially etching the oxide film and the nitride film using a patterned photoresist as a mask” in lines 3-6. However, there is no support for “depositing a nitride film and an oxide film over a substrate” in the specification as well as in the drawings as originally filed. Therefore, the recited claim limitation contains containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 4 recites the limitation “**depositing a nitride film and an oxide film over a semiconductor substrate**, the oxide film being deposited on the nitride film by chemical vapor deposition; sequentially etching the oxide film and the nitride film using a patterned photoresist as a mask” in lines 3-6. However, there is no support for “depositing a nitride film and an oxide film over a substrate” in the specification as well as in the drawings as originally filed. Therefore, the recited claim limitation contains containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 11 recites the limitation “**depositing a nitride film and an oxide film over a semiconductor substrate**, the oxide film being deposited on the nitride film by chemical vapor deposition; sequentially etching the oxide film and the nitride film using a patterned photoresist as a mask” in lines 3-6. However, there is no support for “depositing a nitride film and an oxide film over a substrate” in the specification as well as in the drawings as originally filed.

Therefore, the recited claim limitation contains containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 12 recites the limitation “**depositing a nitride film and an oxide film over a semiconductor substrate**, the oxide film being deposited on the nitride film by chemical vapor deposition; sequentially etching the oxide film and the nitride film using a patterned photoresist as a mask” in lines 3-7. However, there is no support for “depositing a nitride film and an oxide film over a substrate” in the specification as well as in the drawings as originally filled. Therefore, the recited claim limitation contains containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 2, 5, and 7-10 are also rejected as being dependent of the rejected independent base claim.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 4, 5 and 7-12 and 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (1A-1E) in view of Wong et al. (US/6,372,150).

Re claim 1, Applicant's admitted prior art essentially discloses a method for fabricating a capacitor of a semiconductor device comprising: depositing a nitride film (13) and an oxide film (14) over an insulating film (11) and contact plug (12) (see Fig. 1A of Applicant's admitted prior art), the oxide film (14) being deposited on the nitride film (13); sequentially etching the oxide (14) film and the nitride film using a patterned photoresist as a mask; depositing a conductive layer over the substrate depositing a conductive layer (16) on a barrier layer (15); forming a photoresist pattern (17) on the conductive layer (16); etching the conductive layer (16) using the photoresist pattern (17) as a mask to form a lower electrode (16a); removing the photoresist pattern (17) using an etchant; and forming a dielectric film (18) and an upper electrode (19) on a surface of the lower electrode (16a) (see Admitted prior art Figs. 1A-1E).

However, Applicant's admitted prior art does not specifically disclose the use of non-reactive etching gas with respect to the lower electrode, wherein the etching gas is one of H<sub>2</sub>O, a mixture of H<sub>2</sub>, and O<sub>2</sub> in which an amount of H<sub>2</sub> is smaller than an amount of O<sub>2</sub>, a mixture of H<sub>2</sub>O, NH<sub>3</sub>, and N<sub>2</sub>, a mixture of N<sub>2</sub> and NH<sub>3</sub> a mixture of NH<sub>3</sub>, and H<sub>2</sub>O, or a mixture of N<sub>2</sub> and H<sub>2</sub>O is used as the etching gas during removing of the photoresist pattern.

Wong et al. disclose a water vapor plasma etching of metals surfaces that facilitates a removal of organic residues or films by plasma etching metal surfaces covered with an organic material such as photoresist (see Figs. 3 and 4; Abstract; and Col. 4, line 17-18). As Wong et al. disclose, the high vapor etch allows the elimination of a subsequent dry organic material stripping step and reducing the processing time and cost while increasing yields.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided applicant's admitted prior art with

an etchant such as water vapor as taught by Wong et al. because the process would have provided elimination of a subsequent dry organic material stripping step and reducing the processing time and cost while increasing yields.

With regard, the oxide film being deposited on the nitride film by chemical vapor deposition Examiner takes an Official notice because it is well-known in the art and within the scope of Applicant's admitted prior art to deposit an oxide film such as silicon oxide by CVD (chemical vapor deposition) process since CVD process utilized routinely to deposit various types of films during manufacturing of semiconductor device. See *In re Malcolm*, 129 F.2d 529, 54 USPQ 235 (CCPA 1942). See *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970).

Re claim 2, as applied to claim 1 above, both Applicant's admitted prior art and Wong et al. in combination disclose all the claimed limitations including the limitation wherein the upper and lower electrodes are one of Ru, RuO, and a metal material alloyed with Ru (see Applicant's admitted prior art Fig 1C).

Re claim 4, Applicant's admitted prior art discloses a method for fabricating a capacitor of a semiconductor device comprising: depositing a nitride film (13) and an oxide film (14) over an insulating film (11) and contact plug (12) (see Fig. 1A of Applicant's admitted prior art), the oxide film (14) being deposited on the nitride film (13); sequentially etching the oxide (14) film and the nitride film using a patterned photoresist as a mask; forming a conductive region (not shown) on a semiconductor substrate (not shown); forming an interleaving insulating film (11) having a contact hole (not labeled) therein over the conductive region (not shown); forming a contact plug (12) within the contact hole (not labeled); forming insulating film patterns (13 14 ) on of the interleaving insulating film (11) to expose the contact plug (12) and the interleaving

insulating film (11) adjacent to the contact plug (12); depositing a barrier film (15) and a first conductive layer (16) on the contact plug (12) and the insulating film patterns (13 14); forming a photoresist (17) over the contact plug (12) between the insulating film patterns (13 14); sequentially removing the first conductive layer (16) and the barrier layer (15) on the insulating film patterns (13 14) using the photoresist (17) as a mask, thereby forming a lower electrode (16a) and a barrier film (15) in a U-shape in cross-section; removing the photoresist (17) using an etching gas; removing the insulating film patterns (13 14); and sequentially forming a dielectric film (18) and an upper electrode (19) on the lower electrode (16a) and the barrier film (15) (see Admitted prior art Figs. 1A-1E).

However, Applicant's admitted prior art does not specifically disclose the use of non-reactive etching gas with respect to the lower electrode, wherein the etching gas is one of H<sub>2</sub>O, a mixture of H<sub>2</sub>, and O<sub>2</sub> in which an amount of H<sub>2</sub> is smaller than an amount of O<sub>2</sub>, a mixture of H<sub>2</sub>O, NH<sub>3</sub>, and N<sub>2</sub>, a mixture of N<sub>2</sub> and NH<sub>3</sub> a mixture of NH<sub>3</sub>, and H<sub>2</sub>O, or a mixture of N<sub>2</sub> and H<sub>2</sub>O is used as the etching gas during removing of the photoresist pattern.

Wong et al. disclose a water vapor plasma etching of metals surfaces that facilitates a removal of organic residues or films by plasma etching metal surfaces covered with an organic material such as photoresist (see Figs. 3 and 4; Abstract; and Col. 4, line 17-18). As Wong et al. disclose, the high vapor etch allows the elimination of a subsequent dry organic material stripping step and reducing the processing time and cost while increasing yields.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided applicant's admitted prior art with an etchant such as water vapor as taught by Wong et al. because the process would have

provided elimination of a subsequent dry organic material stripping step and reducing the processing time and cost while increasing yields.

With regard, the oxide film being deposited on the nitride film by chemical vapor deposition Examiner takes an Official notice because it is well-known in the art and within the scope of Applicant's admitted prior art to deposit an oxide film such as silicon oxide by CVD (chemical vapor deposition) process since CVD process utilized routinely to deposit various types of films during manufacturing of semiconductor device. See *In re Malcolm*, 129 F.2d 529, 54 USPQ 235 (CCPA 1942). See *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970).

Re claim 5, as applied to claim 4 above, both Applicant's admitted prior art and Wong et al. in combination disclose all the claimed limitations including the limitation wherein the upper and lower electrodes are one of Ru, RuO, and a metal material alloyed with Ru (see Applicant's admitted prior art Fig 1C).

Re claim 7, as applied to claim 4 above, both Applicant's admitted prior art and Kadomura in combination disclose all the claimed limitations including the limitation wherein the insulating film patterns comprise an oxide film (see Fig. 1B)

Re claim 8, as applied to claim 4 above, both Applicant's admitted prior art and Wong et al. in combination disclose all the claimed limitations including the limitation wherein the insulating film patterns are formed by stacking two insulating films (see Fig. 1B).

Re claim 9, as applied to claim 8 above, both Applicant's admitted prior art and Wong et al. in combination disclose all the claimed limitations including the limitation wherein the two insulating films ate a nitride film and an oxide film (see Fig. 1B).

Re claim 10, as applied to claim 4 above, both Applicant's admitted prior art and Wong et al. in combination disclose all the claimed limitations including the limitation wherein the barrier film is only formed on the contact plug within the contact hole (see Fig. 1C).

Re claim 11, Applicant's admitted prior art essentially discloses a method for fabricating a capacitor of a semiconductor device comprising: depositing a nitride film (13) and an oxide film (14) over an insulating film (11) and contact plug (12) (see Fig. 1A of Applicant's admitted prior art), the oxide film (14) being deposited on the nitride film (13); sequentially etching the oxide (14) film and the nitride film using a patterned photoresist as a mask; depositing a conductive layer over the substrate depositing a conductive layer (16) on a barrier layer (15); forming a photoresist pattern (17) on the conductive layer (16); etching the conductive layer (16) using the photoresist pattern (17) as a mask to form a lower electrode (16a); removing the photoresist pattern (17) using an etchant; and forming a dielectric film (18) and an upper electrode (19) on a surface of the lower electrode (16a) (see Admitted prior art Figs. 1A-1E).

However, Applicant's admitted prior art does not specifically disclose the use of non-reactive etching gas with respect to the lower electrode, wherein the etching gas is one of H<sub>2</sub>O, a mixture of H<sub>2</sub>, and O<sub>2</sub> in which an amount of H<sub>2</sub> is smaller than an amount of O<sub>2</sub>, a mixture of H<sub>2</sub>O, NH<sub>3</sub>, and N<sub>2</sub>, a mixture of N<sub>2</sub> and NH<sub>3</sub> a mixture of NH<sub>3</sub>, and H<sub>2</sub>O, or a mixture of N<sub>2</sub> and H<sub>2</sub>O is used as the etching gas during removing of the photoresist pattern.

Wong et al. disclose a water vapor plasma etching of metals surfaces that facilitates a removal of organic residues or films by plasma etching metal surfaces covered with an organic material such as photoresist (see Figs. 3 and 4; Abstract; and Col. 4, line 17-18). As Wong et al.

disclose, the high vapor etch allows the elimination of a subsequent dry organic material stripping step and reducing the processing time and cost while increasing yields.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided applicant's admitted prior art with an etchant such as water vapor as taught by Wong et al. because the process would have provided elimination of a subsequent dry organic material stripping step and reducing the processing time and cost while increasing yields.

With regard, the oxide film being deposited on the nitride film by chemical vapor deposition Examiner takes an Official notice because it is well-known in the art and within the scope of Applicant's admitted prior art to deposit an oxide film such as silicon oxide by CVD (chemical vapor deposition) process since CVD process utilized routinely to deposit various types of films during manufacturing of semiconductor device. See *In re Malcolm*, 129 F.2d 529, 54 USPQ 235 (CCPA 1942). See *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970).

Re claim 12, Applicant's admitted prior art discloses a method for fabricating a capacitor of a semiconductor device comprising: depositing a nitride film (13) and an oxide film (14) over an insulating film (11) and contact plug (12) (see Fig. 1A of Applicant's admitted prior art), the oxide film (14) being deposited on the nitride film (13); sequentially etching the oxide (14) film and the nitride film using a patterned photoresist as a mask; forming a conductive region (not shown) on a semiconductor substrate (not shown); forming an interleaving insulating film (11) having a contact hole (not labeled) therein over the conductive region (not shown); forming a contact plug (12) within the contact hole (not labeled); forming insulating film patterns (13 14 ) on of the interleaving insulating film (11) to expose the contact plug (12) and the interleaving

insulating film (11) adjacent to the contact plug (12); depositing a barrier film (15) and a first conductive layer (16) on the contact plug (12) and the insulating film patterns (13 14); forming a photoresist (17) over the contact plug (12) between the insulating film patterns (13 14); sequentially removing the first conductive layer (16) and the barrier layer (15) on the insulating film patterns (13 14) using the photoresist (17) as a mask, thereby forming a lower electrode (16a) and a barrier film (15) in a U-shape in cross-section; removing the photoresist (17) using an etching gas; removing the insulating film patterns (13 14); and sequentially forming a dielectric film (18) and an upper electrode (19) on the lower electrode (16a) and the barrier film (15) (see Admitted prior art Figs. 1A-1E).

However, Applicant's admitted prior art does not specifically disclose the use of non-reactive etching gas with respect to the lower electrode, wherein the etching gas is one of H<sub>2</sub>O, a mixture of H<sub>2</sub>, and O<sub>2</sub> in which an amount of H<sub>2</sub> is smaller than an amount of O<sub>2</sub>, a mixture of H<sub>2</sub>O, NH<sub>3</sub>, and N<sub>2</sub>, a mixture of N<sub>2</sub> and NH<sub>3</sub> a mixture of NH<sub>3</sub>, and H<sub>2</sub>O, or a mixture of N<sub>2</sub> and H<sub>2</sub>O is used as the etching gas during removing of the photoresist pattern.

Wong et al. disclose a water vapor plasma etching of metals surfaces that facilitates a removal of organic residues or films by plasma etching metal surfaces covered with an organic material such as photoresist (see Figs. 3 and 4; Abstract; and Col. 4, line 17-18). As Wong et al. disclose, the high vapor etch allows the elimination of a subsequent dry organic material stripping step and reducing the processing time and cost while increasing yields.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided applicant's admitted prior art with an etchant such as water vapor as taught by Wong et al. because the process would have

provided elimination of a subsequent dry organic material stripping step and reducing the processing time and cost while increasing yields.

With regard, the oxide film being deposited on the nitride film by chemical vapor deposition Examiner takes an Official notice because it is well-known in the art and within the scope of Applicant's admitted prior art to deposit an oxide film such as silicon oxide by CVD (chemical vapor deposition) process since CVD process utilized routinely to deposit various types of films during manufacturing of semiconductor device. See *In re Malcolm*, 129 F.2d 529, 54 USPQ 235 (CCPA 1942). See *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970).

***Response to Arguments***

8. Applicant's arguments with respect to claims 1, 2, 4, 5 and 7-12 have been considered but are moot in view of the new ground(s) of rejection. Since applicant's argument is based on the newly added limitation (i.e., "Applicant's admitted prior art does not teach or suggest depositing a nitride film and an oxide film over the substrate" (see Page 7 of Applicant's argument of Paper No. 15)), the Examiner respectfully submits that this argument is considered moot in view of the new matter objection under 35 U.S.C. § 132 that is set forth in Paragraph 2 and the rejection under 35 U.S.C. § 112 1<sup>st</sup> that is set forth Paragraph 5 herein above which necessitated the new ground(s) of rejection by the amendment filed on February 5, 2003 in Paper No. 15.

9. Applicant's arguments filed on February 5, 2003 in Paper No. 15 with respect of the Drawings have been fully considered but they are not persuasive.

With respect to the drawing objection applicant's argued that claim 1 is amended to specifically recite "depositing a nitride film and an oxide film over a substrate, the oxide film

being deposited on the nitride film by chemical vapor deposition". This feature is illustrated in FIG. 2C. Withdrawal of the objection to the drawings and approval of the revised formal drawings filed September 19, 2002, are, therefore, respectfully requested.

In response applicant's argument, the Examiner respectfully disagrees with applicant's contention because Fig. 2C of the instant application only shows the nitride film (103) and the oxide film (104) formed over the insulating film (101) not on the substrate. As indicated in Paragraph 2, the newly added limitation (i.e., depositing a nitride film and an oxide film over a substrate) contains new matter. In addition, the conductive layer (106) being formed on the barrier film (105) wherein the barrier film is conformally formed over the oxide (103) nitride (103) the plug (102) and insulating film (101) not on the substrate (10). Therefore, the drawings objection under 37 CFR 1.83(a) is deemed proper.

In addition, the Examiner respectfully submits that the combination Applicant's admitted prior art (Figs. 1A-1E) and Wong et al. '150 teach all the claimed limitations as applied in Paragraph 7 herein above. Therefore, the *prima facie* case of obviousness has been met and the rejection under 35 U.S.C. § 103 is deemed proper.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Correspondence***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (703) 306-4511. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Brook Kebede

*Brook*  
April 14, 2003

W. DAVID COLEMAN  
PRIMARY EXAMINER  
*W. David Coleman*